



## LOWER-LIMB PROSTHETICS EXAMINATION

For Physicians, Surgeons, and Therapists

1. Anterior displacement of the socket of the corsetless PTB prosthesis is desirable because it
  - a. encourages knee flexion between heel strike and foot flat
  - b. facilitates "roll over" between mid-stance and heel off
  - c. minimized the tendency for hyperextension of the knee
  - d. all of the above
  
2. During static alignment of the corsetless PTB prosthesis, the prosthetist
  - a. insets the foot one inch
  - b. outsets the foot one inch
  - c. insets the foot one half inch
  - d. outsets the foot one half inch
  
3. Which of the following is/are NOT pressure tolerant area(s) on the residual limb of the below knee amputee?
  - a. Anterolateral aspect of the lateral tibial condyle
  - b. Lateral surface of the fibula, between the head and lateral distal end
  - c. Popliteal fossa
  - d. Inferior surface of the medial tibial condyle
  - e. Pre-tibial muscle bellies
  
4. As a general rule, the shorter the above-knee level of amputation the:
  - a. more the knee bolt should be displaced anteriorly
  - b. "softer" the heel cushion of the prosthetic foot should be
  - c. "stiffer" the heel cushion of the prosthetic foot should be
  - d. more the socket should be extended
  
5. Static alignment of an above knee prosthesis usually includes:
  - a. TKA alignment
  - b. adduction of the lateral wall of the socket
  - c. flexion of the socket
  - d. All of the above

6. When the below knee amputee wearing a corsetless PTB prosthesis is in mid stance on the prosthetic side, the anatomical knee joint on the prosthetic side should be:
  - a. extended
  - b. flexed
  - c. subjected to a valgus moment
  - d. subjected to the varus moment
  - e. Both b and d
  - f. Both a and c
  
7. At the time of mid stance during normal gait, the floor reaction force is:
  - a. posterior and lateral to the anatomical hip joint on the stance side
  - b. anterior and lateral to the anatomical knee joint on the stance side
  - c. posterior and medial to the anatomical hip joint to the stance side
  - d. anterior and medial to the anatomical knee joint on the stance side
  
8. The anatomical knee joint of the below knee amputee wearing a corsetless PTB prosthesis is most likely to tend to be hyperextended at:
  - a. heel off
  - b. Foot flat
  - c. mid stance
  - d. heel strike
  
9. Hyperextension of the anatomical knee joint of the below-knee amputee may be caused by:
  - a. insufficient flexion of the socket
  - b. planter flexion of the prosthetic foot
  - c. too soft a heel cushion
  - d. posterior displacement of the socket
  - e. too long a keel of the SACH foot
  - f. All of the above
  
10. Flexion of the socket of a corsetless PTB prosthesis is desirable because it:
  - a. encourages knee flexion during stance phase
  - b. discourages the tendency for the knee to hyperextend
  - c. enhances weight bearing on the anterior surface of the limb
  - d. All of the above
  
11. All of the following statements about the static alignment of the above-knee prostheses are true, except the:
  - a. knee bolt location is on the TKA line
  - b. lateral wall is usually adducted
  - c. "trochanter" mark used in TKA alignment is determined by the location of the greater trochanter
  - d. Prosthetic socket is usually flexed

12. As the inset of the prosthetic foot of a PTB SC corsetless prosthesis is increased, the pressure
- on the lateral surface of the fibula decreases
  - under the medial tibial condyle increases
  - above the medial femoral condyle increases
  - above the medial femoral condyle decreases
  - on the lateral surface of the fibula increases
  - b, c and e
  - Both a and d
13. When side joints and a thigh corset are used for reducing the loading on the residual limb of the below knee amputee, alignment of the prosthesis must be changed. Which of the following alignment features should be changed?
- Flexion is removed from the socket
  - The socket is displaced posteriorly
  - A soft heel cushion is used
  - All of the above
14. During a cycle of gait, the limbs undergo axial or length rotations about their long axes. During which of the following parts of the cycle will the limb be externally rotating?
- Heel Strike to Foot Flat
  - Toe Off to Heel Strike
  - Mid Stance to Toe Off
  - Foot Flat to Mid Stance
  - None of the above
15. At the time of foot flat during gait, which of the following muscles or muscle groups are active?
- Hip extensors, quadriceps and dorsiflexors
  - Hip flexors, hamstrings and plantar flexors
  - Hip extensors, quadriceps and plantar flexors
  - Hip flexors, quadriceps and dorsiflexors
16. At the time of mid stance on the prosthetic side, the wearer of a Canadian Hip Disarticulation prosthesis will be stable if the floor reaction force passes
- posterior to the hip joint, knee joint and ankle joint
  - anterior to the hip joint, knee joint and ankle joint
  - through the hip joint and posterior to the knee and ankle joints
  - posterior to the hip joint and anterior to the knee and ankle joints
  - None of the above
17. During normal two legged standing the floor reaction force passes:
- through and posterior to the hip joint
  - lateral and anterior to the knee joint
  - lateral to the subtalar joint and anterior to the ankle joint
  - All of the above
  - None of the above

18. The major advantage of the knee disarticulation level of amputation is it:
- Facilitates the placement of the mechanical knee joint
  - Provides for the higher degree of cosmetic acceptability
  - Provides the potential for terminal end bearing
  - Makes the prosthetic fitting easier for the prosthetist
19. A patient wearing a quadrilateral socket experiences discomfort in the proximal-medial and lateral-distal aspects of his residual limb. Which of the following gait compensations is he most likely to employ to alleviate the discomfort?
- Vaulting on the non-amputated side
  - Walking with an abducted gait
  - Lateral bending of the trunk
  - Excessive heel rise
  - Walking with a circumducted gait
  - Either b or c
  - Either a or e
20. The Patellar Tendon Bearing, Supracondylar, Suprapatellar Prosthesis is most strongly indicated for which of the following?
- Female amputees
  - Below knee amputees with relatively long residual limbs
  - Below knee amputees with relatively short residual limbs
  - Geriatric amputees
21. Side joints and a thigh corset play a role in prescription considerations for below-knee amputees. The least important of these considerations is:
- Bilaterality
  - Activity level
  - Age
  - Length of the residual limb
  - Skin condition
  - Ligamentous stability of the knee joint on the prosthetic side
  - A painful knee joint on the prosthetic side
  - Both a and c
22. The dorsiflexion (instep) bumper of the single axis foot simulates, to some degree, the activity of which of the following muscles?
- Gastrocnemius
  - Extensor digitorum longus
  - Peroneus tertius
  - Quadrates plantae
  - Tibialis anterior

23. Knee stability for the above-knee amputee whose prosthesis incorporates a single axis constant friction knee is best insured by
- correct TKA alignment
  - the use of the "stiff" heel cushion
  - the use of a "soft" dorsiflexion bumper
  - the use of "stiff" dorsiflexion bumper
  - the use of "soft" heel cushion
  - a, d and e
  - a, c and d
  - a, b and c
24. The medial opening Syme prosthesis resists compression and tension loading to a much greater extent than the posterior opening Syme prosthesis. Consequently, the medial opening Syme is the prosthesis of choice. One would only prescribe the posterior opening Syme if:
- the amputation level was too short
  - the amputation level was too long
  - a SACH foot was not available
  - the circumference of the bulbous distal end was too large
  - the circumference of the bulbous distal end was too small
  - the malleoli had been beveled
25. The preferred prosthetic foot and ankle for the juvenile and most female amputees is the :
- Safe foot
  - Greisinger foot
  - SACH foot
  - Single axis foot
26. Serious consideration should be given to the use of a single axis foot when dealing with:
- bilateral below-knee amputees
  - bilateral above-knee amputees
  - knee disarticulation amputees
  - very short above-knee amputees
  - geriatric above-knee amputees
  - b, d and e
  - a and b
27. If a below-knee amputee wearing a corselless PTB prosthesis experiences anterior distal pain between heel strike and foot flat, the pain is most likely to be caused by:
- insufficient flexion of the socket
  - too much anterior displacement of the socket
  - plantar flexion of the prosthetic foot
  - too much flexion of the socket
  - insufficient anterior displacement of the socket
  - both b and d
  - a, c and e

28. During normal gait the anatomical knee joint on the stance side is, at the time of mid stance, subjected to which of the following types of loading?
- Compression between the lateral tibial and femoral condyles
  - Tension on the medial collateral ligaments
  - Compression between the medial tibial and femoral condyles
  - Tension on the lateral collateral ligaments
  - Both c and d
  - Both a and b
29. Static alignment of an above-knee prosthesis includes the proper alignment of the single axis knee bolt in the horizontal (transverse) plane. The knee bolt is normally aligned in:
- 10° of internal rotation
  - 5° of external rotation
  - 10° of external rotation
  - 5° of internal rotation
  - None of the above
30. Flexion of the socket of the above-knee prosthesis permits the amputee to:
- take a normal step forward with the non-amputated limb
  - take a longer step with the prosthesis
  - stabilize the knee with less effort
  - take a shorter step with the prosthesis
31. Between toe off and mid swing during normal gait, the quadriceps serve to:
- extend the knee
  - flex the hip
  - prevent too much knee flexion
  - None of the above
  - All of the above
32. Very short above-knee levels of amputation tend to predispose to the development of fairly specific soft tissue contractures about the hip joint. Consequently, the pre-prosthetic exercise regimen should include exercises to strengthen the:
- hip flexors
  - hip adductors
  - hip internal rotators
  - hip abductors
  - hip external rotators
  - hip extensors
  - b, c and f, above
  - a, d and e, above

33. "Soft socket" PTB prostheses are most strongly indicated for which of the following types of patients?
- Systemic vascular disease
  - Extensive scarring of the residual limb
  - Volumetrically unstable residual limbs
  - Very "bony" residual limbs
  - All of the above
34. The extent to which a hip flexion contracture can be accommodated in an above-knee socket depends primarily upon:
- The judgment of the prosthetist
  - The pre-prosthetic exercise program
  - The length of the residual, transected femur
  - TKA alignment of the prosthesis
35. During static alignment of the corsetless PTB prosthesis, the prosthetist normally aligns the socket in:
- 5 - 10° of extension
  - 12 – 14° of flexion
  - 12 - 14° of extension
  - 20 - 25° of flexion
36. When side joints and a thigh corset are prescribed for reducing weight bearing on a below-knee residual limb, it is often necessary to alter the alignment of the prosthesis. Which of the following changes have to be made?
- More flexion must be built into the socket
  - The socket must be displaced forward
  - A stiffer heel cushion must be used
  - None of the above changes
  - All of the above changes
37. If the keel of the SACH foot on a PTB prosthesis is too long, it will tend to cause excessive:
- plantar flexion
  - dorsiflexion
  - knee flexion
  - knee extension
  - All of the above
  - None of the above
38. If the socket of a PTB prosthesis is displaced too far forward relative to the prosthetic foot, it will tend to cause:
- hyperextension of the knee on the prosthetic side
  - excessively abrupt knee flexion on the prosthetic side
  - a shortened step length on the prosthetic side
  - delayed knee flexion

39. In the frontal plane, corsetless PTB prostheses are normally aligned with the prosthetic foot inset relative to the socket. As the amount of the inset of the foot is decreased, the
- magnitude of the varus moment at the knee joint is increased
  - magnitude of the valgus moment at the knee joint is decreased
  - loading on the lateral aspect of the residual limb is increased
  - loading on the proximal-medial aspect of the residual limb is increased
  - magnitude of the varus moment at the knee joint is decreased
40. As a general rule, the below-knee amputee probably needs a new prosthetic socket when the number of stump socks being used exceed
- 5 ply
  - 10 ply
  - 15 ply
  - 20 ply
41. Which of the following will tend to cause the above-knee amputee to walk with an abducted gait?
- Discomfort in the perineum
  - Improper shaping (contouring) of the lateral wall of the socket
  - Discomfort on the lateral aspect of the residual limb
  - Too large a medial, anteroposterior dimension of the socket
  - b and c
  - All of the above
42. A whip in the gait of the above knee amputee is usually caused by:
- too stiff a heel cushion on the prosthetic foot
  - not enough flexion built into the socket
  - malalignment of the knee bolt in the horizontal plane
  - Insufficient toe out of the prosthetic foot
43. The normal limb is accelerated forward during the swing phase of gait by
- the quadriceps
  - gravity
  - the hip flexors
  - inertia
44. In normal use the pressure within the above-knee suction socket is:
- positive during swing phase, negative during stance phase
  - negative during swing phase, positive during stance phase
  - negative at all times
  - positive at all times
45. When vascular disease is the cause for amputation:
- the amputation level should always be above the knee
  - amputation is treated as an emergency procedure
  - the anterior flap of the B/K limb should be the shorter of the two
  - the anterior flap should be longer than the posterior flap



46. An open circular amputation
- produces scarring that may prevent prosthetic fitting
  - is useful to conserve residual limb length in crushing injuries
  - always requires revision following closure
  - precludes the formation of skin flaps
47. Symptomatic neuromata usually are the result of:
- failure to inject the transected nerve
  - the nerve being cut too long
  - failure to ligate the cut nerve end
  - the nerve being cut too short
48. In a below-knee amputation the fibula should be:
- totally excised
  - transected and removed by subperiosteal dissection
  - transected and removed by extraperiosteal dissection
  - cut at the same level as the peroneal nerve
49. The impression of feeling the amputated limb is commonly called:
- psychogenic sensation
  - peripheral pain
  - phantom sensation
  - phantom pain
50. Suction suspension of the above-knee prosthesis is best prescribed in the following situation(s):
- Short residual limb
  - Scarred residual limb
  - Young patient
  - Elderly patient
  - Patient with a long, well contoured residual limb
  - Both c and e above